SUPERFUND STANDBY PROGRAM
New York State
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

SITE ID 277: CAMILLUS CUTLERY COMPANY

SITE SUMMARY REPORT

Onondaga Lake Project
Task 5: 104(e) Review

Site No. 734030-002
Work Assignment Number D003060-27

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1.0 SITE DESCRIPTION

The information referenced in this report was mainly obtained from the 104(e) responses of Camillus Cutlery Company (Camillus Cutlery, Company ID 2033). Three mailings were received from Camillus Cutlery on September 12, 1996, May 29, 1997, and October 20, 1997. The supplemental responses were based on NYSDEC's May 1, 1997 and September 22, 1997 requests for additional information. Information obtained from other sources is noted, as necessary.

1.1 Location

The Camillus Cutlery facility is located at 54 Main Street in the Town of Camillus, Onondaga County, New York. Figure 1 shows the location of the facility in relation to Onondaga Lake. The site is bound by Genesee Street (Main Street) to the south, Ninemile Creek to the east, and North Street to the west and northwest. Based on the submitted site map (Mailing No. 1, p. 000004), the site is between three and four acres in area. However, Camillus Cutlery indicated that property of unspecified dimensions was purchased to the north of the facility (including what is currently a parking lot) which is shown on the submitted map (Mailing No. 3). Property lines are not clearly visible on the site map provided in the third mailing and the map scale is not indicated.

1.2 Geology

The surficial geology of the Syracuse area was strongly influenced by the most recent glacial advance (Wisconsin age, 12,000 to 14,500 years ago). The area occupies a region that was covered by Lake Iroquois, a large glacial lake situated in front of the ice margin. The broad flat-lying plains situated north from Syracuse to Lake Ontario were formed beneath Lake Iroquois and are characterized by lacustrine fine sand and silt deposits. Additional glacial features common to the region are moraines, drumlins, U-shaped valleys, and meltwater channels.

Onondaga Lake and all its major tributaries lie within glacial meltwater channels. These features originally were conduits carrying meltwater at large volumes and high velocities away from the glacier. Sediment types characteristically found in meltwater channels are sands and gravels. These relict features form important water bearing and transmitting units which form an irregularly branching, net-like pattern.

The bedrock geology of the greater Syracuse area includes Lower to Middle Paleozoic age sedimentary rocks predominated by carbonate (dolostone and limestone) and shale, and containing some sandstone, siltstone, and evaporites. Bedrock directly beneath the area (as well as underneath Onondaga Lake) is Silurian Vernon Shale (Rickard and Fischer, 1970) which has low permeability, but does possess secondary porosity due to fractures. Soil boring logs were not provided by Camillus Cutlery.

1.3 Hydrogeology

According to the Camillus USGS quadrangle, the ground surface elevation at the Camillus site is approximately 410 feet NGVD (see Figure 2). Groundwater elevation data were not provided by Camillus Cutlery. Shallow groundwater is expected to flow towards Ninemile Creek (approximate elevation 405 feet NGVD).

1.4 Surface Water Hydrology

Camillus Cutlery stated in its submittal that stormwater runoff from the facility is not connected to the Onondaga County Department of Drainage and Sanitation (OCDDS) system, but rather flows toward Ninemile Creek. A stormwater discharge permit has not been required for the facility since October 28, 1991 when Camillus Cutlery was permitted to discharge used coolant water into Ninemile Creek (see Section 2.3). It was stated that any outside storage of materials is "properly covered and/or does not effected [sp.] or impede the natural flow of storm water" (Mailing No. 1, p. 000485). Stormwater flow patterns could not be ascertained from the site map provided (Mailing No. 1, p. 000004) and the facility's storage areas were not described. Based on the Federal Emergency Management Agency floodway map of the Village of Camillus (Town of Camillus, New York, Panel 8 of 9, Community Panel No. 360570 0008 D), it appears that a portion of the Camillus Cutlery site is within the 100-year floodplain.

On a map provided in Camillus Cutlery's third mailing, an area was highlighted denoting the footprint of an on-site landfill. This map shows that a portion of the landfill is located under a grassed surface, and that there are two drains situated within the landfill area in what appears to be the facility parking lot. A portion of the landfill is also shown to extend to the west (left) bank of Ninemile Creek without any sort of barrier indicated (the concrete retaining wall extends only over a limited area to the south of the landfill area, as shown on the submitted map). The purpose and ultimate discharge point of the drainage system located within the landfill area was not indicated.

2.0 SITE HISTORY

2.1 Owners/Operators

The Camillus Cutlery facility has been in operation at its current location of 54 Main Street (Genesee Street) in Camillus, Onondaga County, New York since 1876.

2.2 Site Operations

Camillus Cutlery, whose operations have basically not changed over time, manufactures pocket and sports knives (SIC code 3421). The facility processes, as described in Camillus Cutlery's Mailings No. 1 and 2, are listed below:

- Rolled steel is processed through stamping machines to fashion the material into the shapes of various cutlery pieces;
- Once stamped, cutlery pieces are introduced to a grinding process where blade edges and detailed shapes are formed. Before the 1940s, water from Ninemile Creek was used as a grinding wheel coolant and then discharged back into the creek. This resulted in unpleasant working conditions because the creek water reportedly contained sewage from the Marcellus area. To correct this problem, a large cistern was constructed in the early 1940s to hold and recycle coolant water, making a closed system, and eliminating the need for creek water. The closed coolant water system apparently was temporary because Camillus Cutlery was provided coolant water discharge permits for 1983 through 1993 (see Section 3.2) for the discharge of waste coolant water into Ninemile Creek;
- Blades may be subjected to one of two types of heat treatment once cutlery shapes are formed. The blades are either submerged into a vat of molten lead (carbon blades) or placed in a high temperature oven (stainless steel blades). The lead vat

operates at 1,500° F (Mailing No.1, p. 000500), and the oven temperature was not specified;

- Between approximately 1940 and 1968, a pickling operation was used to remove scale from steel with hydrochloric acid;
- Prior to the 1970s, a collection system "located out side [sp.] the factory" was used to accumulate vacuumed solids and dust which were generated by the numerous "dry grinding, buffing and polishing wheels" (Mailing No. 2, p. 5). Subsequently, during the 1970s, an "internal system of individual torit or vacuum units" was implemented to replace this system. In Camillus Cutlery's description of this system, it was not specified if the outside collection system consisted of a structure or simply a pile of material, where it was located, and if the vacuuming was done by hand or automatically. The new internal "torit" and vacuum unit system was not described in detail, and it was not stated whether this system is still in operation;
- A tumbling process, which incorporates soap and process water, is used to remove metal burrs and to produce a shine on the product. This is followed by finishing and polishing. These three processes are collectively referred to as the barreling process because barrels are used as containers (Mailing No. 1, p. 000486). Barrel operations began in the 1960s. In the spring of 1982, in accordance with OCDDS requirements, the barrel operation sludge and liquids were pre-treated through a device known as a "Flex-Tube" Filter (discussed further in Section 2.3) and then discharged into the OCDDS system through what is known as Sewer No. 1;
- Once the cutlery steel parts are formed, handles are secured to the cutlery, and then edges are ground and buffed to improve the fit and finish of the pieces;
- A contractor is used to remove used petroleum distillate, clean facility tanks, replace used liquids, and recycle the by-product (Mailing No. 1, p. 000007);
- Prior to 1950, the products were wiped clean by hand. Since that time, wash/rinse and solvent tanks were integrated into the manufacturing process. There are parts washers and product lubricators located at various points in the manufacturing

process, including just prior to shipment. Solvents & Petroleum of Syracuse, New York, services this equipment by removing used petroleum distillate, cleaning tanks, and replacing the liquid. A vapor degreaser is also used at the facility, but on a limited basis; and

- Packaging and shipment off-site.

Until approximately 1968, the facility maintained an on-site landfill under what is now the facility's parking lot. In 1968, construction was completed on the parking lot, thereby completely "capping" the landfill (Mailing No. 2, p. 2). In the site map that was submitted with Camillus Cutlery's third mailing, a portion of the landfill area (as indicated by Camillus Cutlery with a highlighter) is shown to lie underneath a grassed area. Furthermore, two unidentified drains are shown within the landfill area. Based on this information, this would indicate the landfill was not completely and effectively covered.

It is not apparent from the submitted site map (Mailing No. 1, p. 000004), where the materials storage facilities (e.g., grinding wheel coolant cistern, oil quenching tanks) are located, and specifically whether the storage sites are situated indoors and on paved surfaces. The location of each facility operation was not identified on the site map. Along the right margin of the site map, there is what appears to be a cross-sectional view of the facility, however, this view's location is not specified on the plan view. Furthermore, on page 000239 of Mailing No. 1, a process that produces scrap metals known as "blanking" is mentioned, however, a description was not provided. In the third submittal, a cooling vat is shown to be situated over the landfill area, but its specific role in site operations was not identified.

2.3 Generation and Disposal of Wastes

As identified in Camillus Cutlery's Mailings No. 1 and 2, the hazardous and non-hazardous wastes listed below have been generated at the Camillus Cutlery facility.

Hazardous Wastes

- The submergence of carbon blades into molten lead produces hazardous waste mixtures of charcoal and lead (charcoal used to maintain heat), and corncob and lead (corncob to dry the blades after oil quenching). Prior to 1968, these waste were disposed in the on-site landfill, and between approximately 1968 and 1993, these wastes were landfilled at different sites including the Camillus and Amboy landfills. The Amboy landfill was located near an old airport in Amboy, New York, and the landfill in Camillus was located off Milton Avenue in Camillus, New York. Since 1994, these two types of wastes were transported off-site for incineration (Mailing No. 1, p. 000011 and Mailing No. 2, p. 2);
- Solvents are used for cutlery lubrication and cleaning, and have been used at the facility since approximately 1950. A solvent tank is located in the process line after the wash tank. The solvents, which include waste petroleum distillate and naphtha products (e.g., Varsol #1, waste petroleum naphtha) are disposed off-site (Mailing No. 1, pp. 000129-000217). One 100-gallon under-ground storage tank was used to store Varsol for an unspecified period of time. On May 4, 1992, the tank, which appeared to be in good structural condition, was removed and then the area was covered and sealed (Mailing No. 1, p. 000428). Tanks which were used for solvent storage required periodic disposal of solvent sludge which contained dirt, grime, solvent residue, and other materials. Between approximately 1950 and 1968, solvent wastes were disposed in the on-site landfill. Between approximately 1968 and 1987, these wastes were disposed at the Camillus and Amboy landfills. Since 1987,

solvents have either been flashed off at the facility (Mailing No. 1, p. 000442), or recycled by either Solvents & Petroleum of Syracuse or Safety Kleen of Mattydale, New York (Mailing No. 1, pp. 000129-000217);

- During the pickling process, a sludge was produced containing dirt, grime, and residue hydrochloric acid. It was stated in the submittal that the sludge contained a very low or non-existing acidity level at the time of its disposal at the on-site landfill from approximately 1940 to 1968 (Mailing No. 2, p. 3);
- Between approximately 1941 and 1951, trichloroethene was used for cleaning purposes. As noted in Mailing No. 2, most of this trichloroethene evaporated and/or flashed off. Sludge resulting from this cleaning process consisted of "dirt, buffing residue, grime and traces of the Trichloroethene" (Mailing No. 2, p. 3), and was disposed in the on-site landfill. The degreasing process using trichloroethene was not used again until September 1989 when a new vapor degreaser was purchased. Solvents & Petroleum has been providing maintenance for the vapor degreaser since 1990, which involves the periodic transport and disposal of "Trichlor (1,1,1-trichloroethane)" (Mailing No. 1, pp. 000415-000420). Camillus Cutlery did not explain the switch from trichloroethene to 1,1,1-trichloroethane;
- Light ballasts containing polychlorinated biphenyls (PCBs) were landfilled one time, at Chem Waste Management in Model City, New York in Niagara County in 1994 (Mailing No. 1, p. 000421);
- In 1996, one 55-gallon drum of asbestos waste was removed from the tempering oven during oven repair, and was disposed at Northeast Environmental in Canastota, New York, in Madison County (Mailing No. 1, pp. 000423-000427). It should be noted that detection of asbestos was first conducted in 1991 (Mailing No. 1, p. 000424), and it was not until 1996 that the disposal shipment was made; and
- A waste stream (1987 to 1993, 1996 to the present) consisting of lead and oil is produced during the removal of oil from quench tanks. One shipment of the lead and oil mixture was transported off-site and recycled by Solvents and Petroleum of

Syracuse, New York (Mailing No. 1, pp. 000438-000441). It was not specified whether this shipment of five 55-gallon drums was generated over a nine-year period (from 1987 to 1996) or only over the six-month period in 1996 (February 29, 1996 to July 25, 1996).

Non-Hazardous Wastes

- Scrap metals (i.e., brass, nickel, silver, stainless steel, aluminum, carbon steel, chrome, and copper) (Mailing No. 1, pp. 000239-000399) are produced from the stamping of rolled steel. As noted on page 3 of Mailing No. 2, the metals have "always" been recycled by a variety of vendors including Matlow Company, Inc. (Company ID 2065) in Solvay, New York (Mailing No. 1, p. 000321);
- A non-hazardous mixture of oils and corncob is generated during the stamping process and during the drying of parts (Mailing No. 1, pp. 000102-000128). This material was used as fill at the facility's on-site landfill until 1968, and since then has been landfilled at different sites including the Camillus and Amboy landfills which are now closed. Since 1990, this material has been landfilled at Seneca Meadows, Inc. in Waterloo, New York in Seneca County and High Acres Landfill & Recycling Center in Fairport, New York in Monroe County. In the company's earlier years, sawdust was used for fill instead of corncob;
- During the grinding operations, water soluble oil is discharged into a floor trench system. Grinding fluid solids are settled out in a collection tank, and the liquid is pumped back into the grinding operation. The generated grinding swarf consists of grinding material, steel, and grinding wheel material. Prior to 1968, the swarf was disposed in the on-site landfill and, since then, at different landfills including ones in Camillus and Amboy (Mailing No. 1, pp. 000047-000101). Camillus Cutlery stated that it does not know the grinding machinery's installation date;

- There are three exhaust emissions points associated with the heat treating operations. Two NYSDEC Certificates to Operate Air Contamination Sources were submitted (Mailing No. 1, pp. 000498-000503) which note that the emissions are generated from the quench oil tanks and from the vat of molten lead which is covered with charcoal. The contaminants detected were miscellaneous organics, lead, and oil mist;
- The solids and dust from the "dry grinding, buffing and polishing wheels," which were vacuumed into an outside collection system, consisted of steel particles, handle material, dust, and grime (Mailing No. 2, p. 5). This material was either emptied into the on-site landfill or disposed at the Camillus Landfill. The dust that arose from this collected material would have blown over the Ninemile Creek area. Camillus Cutlery stated that this volume is unknown but minimal. Since the implementation of the "internal system of individual torit or vacuum units" in the 1970s, this waste has been removed with the normal facility trash as non-hazardous industrial waste;
- Barreling operation sludge and liquids were originally discharged into the Village of Camillus sewer system, and eventually to the OCDDS system through the facility's Sewer No. 1 (Mailing No. 2, p. 4). Since the "Flex-Tube" Filter was installed in the spring of 1982, the filtered barreling swarf has been transported to landfills, including the Camillus and Amboy landfills until the time they were closed. It was also stated in Camillus Cutlery's submittal that barreling swarf is now combined with grinding swarf and disposed as one waste stream, and that this combination is then accumulated and landfilled together as non-hazardous waste. The location at the facility where both swarf streams are combined is not specified in their submittal;
- Coolant water was used to cool the facility's air compressors and oil quenching tanks, and was then discharged into Ninemile Creek until October 28, 1991. A "closed loop system which eliminated" cooling water discharges was then integrated into the facility (Mailing No. 1, p. 000007). Two New York State Pollutant Discharge Elimination System (SPDES) permits were submitted from 1983 through 1993 (Mailing No. 1, pp. 000507-000516) permitting this discharge to Ninemile

Creek. As of October 28, 1991, the SPDES permit was discontinued (Mailing No. 1, p. 000505). The site map that was submitted in Camillus Cutlery's third mailing indicates there are two drains located within the on-site landfill area. It was not indicated in their submittal exactly to where these drains have been discharging stormwater, or whether the stormwater is exposed to landfilled waste;

- Sanitary wastewater is discharged from this facility to the OCDDS system through the facility's Sewer No. 2. An OCDDS Industrial Wastewater Discharge Permit No. 56 (Mailing No. 1, pp. 000518-000550) was valid at the time of the submittal through July 15, 1998. It was not indicated for how long this discharge has been ongoing;
- In 1950, when the wash/rinse and solvent tanks were introduced into the manufacturing process just prior to product shipment, a mixture of waste soap, residue, and water was generated by the wash tank (Mailing No. 2, p. 3). Until 1993, this generated water and oil mixture was discharged through the facility's Sewer No. 2 to the Village of Camillus sewer system, which eventually became part of the OCDDS system. Since 1994, this wash/rinse water has been transported off-site for recycling (Mailing No. 1, p. 000218); and
- General refuse and wastes are separated into recyclable and non-recyclable materials which are then handled by the Village of Camillus. On page 4 of Camillus Cutlery's Mailing No. 2, it was stated that this trash has been hauled off-site in this manner since 1987. Prior to 1987, the Village of Camillus and Camillus Cutlery hauled the facility's trash to the Camillus and Amboy landfills.

Although the processes that are used to manufacture knives have not changed significantly over time, varying customer demand (stainless steel vs. carbon knives) has resulted in a changing quantity of individual waste types generated. Supporting documentation was provided by Camillus Cutlery (e.g., laboratory reports, hazardous waste manifests, and shipping manifests) to identify the types and quantities of hazardous and non-hazardous wastes that have been produced at their facility. NYSDEC Hazardous Waste Regulatory Fee Information Forms and NYSDEC Hazardous Waste Report Summaries were submitted (Mailing No. 1, pp. 000443-000475) which provide waste information for the time period between 1990 and 1995.

Camillus Cutlery also provided copies of USEPA Form R, Toxic Chemical Release Inventory reporting forms for 1991 through 1995 (Mailing No. 1, pp. 000307-000399). Chemicals identified as being released to the environment (sewer system/publicly-owned treatment works, and off-site disposal locations both inside and outside of the basin) during this period include copper and chromium. A list of the facility's inventory that requires Material Safety Data Sheets (MSDS) was also provided on pages 000400-000419, however, the actual MSDS were not submitted. It was stated in the submittal that "most materials listed on the MSDS listing are used during the course of production. Containers, etc. are then recycled or become normal waste which is collected and picked up by the Village of Camillus" (Mailing No. 1, p. 000009).

The information that was provided in the hazardous waste manifests and generated waste summary tables (Mailing No. 1, pp. 000010-000441) has been summarized in Table 1.

Because of discrepancies in the waste disposal information submitted by Camillus Cutlery, Table 1 is only to be used to provide a general overview of the facility's hazardous waste production. Some of the discrepancies are listed below:

- The quantity of generated solvents from equipment cleaning and degreasing operations that was disposed by Solvents and Petroleum in 1991 is listed as both 745 gallons in the hazardous waste manifests (Mailing No. 1, pp. 000151-000153, 000467) and 715 gallons in the summary response to Question No. 8 (Mailing No.1, p. 000129). Furthermore, the reported quantity of solvents disposed in 1990 is listed

Table 1: Summary of Disposal of Hazardous Wastes

Waste Type	Estimated Annual Quantity[1]	Year or Period of Disposal[2]	Disposal Site
Charcoal and lead waste from the heat treatment process (Mailing No. 1, p. 000011)	3,700 lbs	1996	Solvents & Petroleum
	3,200 lbs	1995	Laidlaw Env. Services
	3,500 lbs	1994	Laidlaw Env. Services
	8,800 lbs	1993	North East Environmental
	1,800 lbs	1991	North East Environmental
	4,200 lbs[3]	1968-1990[4]	Camillus and Amboy landfills
	4,200 lbs[3]	? - 1968	On-site landfill
Corncob and lead waste from the heat treatment drying process (p. 000026)	2,000 lbs	1996	Solvents & Petroleum
	3,000 lbs	1996	Laidlaw Env. Services
	2,200 lbs	1995	Laidlaw Env. Services
	1,800 lbs	1994	Laidlaw Env. Services
	300 lbs	1993	North East Environmental
	1,800 lbs	1991	North East Environmental
	1,850 lbs[3]	1968-1990[4]	Camillus and Amboy landfills
	1,850 lbs[3]	? - 1968	On-site landfill
Solvents from parts washers and/or spent oil (Mailing No. 1, p. 000129)	195 gals	1996	Safety Kleen
	880 gals	1996	Solvents & Petroleum
	728 gals	1995	Safety Kleen
	594 gals	1994	Safety Kleen
	622 gals	1993	Safety Kleen
	605 gals	1993	Solvents & Petroleum
	275 gals	1992	Solvents & Petroleum
	715 gals	1991	Solvents & Petroleum

Table 1: Summary of Disposal of Hazardous Wastes (continued)

Waste Type	Est. Annual Estimated Quantity[1]	Year or Period of Disposal[2]	Disposal Site
Solvents from parts washers and/or spent oil (Mailing No. 1, p. 000129)	440 gals	1990	Solvents & Petroleum
	550 gals	1989	Solvents & Petroleum
	550 gals	1988	Solvents & Petroleum
	440 gals	1987	Solvents & Petroleum
	660 gals[3]	1968-1987[4]	Camillus and Amboy landfills
	660 gals[3]	1950-1968	On-site landfill
Pickling sludge (Mailing No. 2, p.3)	5 gal per week	1940-1968	On-site landfill
1,1,1-Trichloroethane (Trichlor) generated from vapor degreaser purchased in 1996 (Mailing No. 1, p. 000415)	25 gals	1996	Solvents & Petroleum
Trichloroethene generated during cleaning operations (Mailing No. 2, p. 3)	15-20 gals per week	1941-1951	On-site landfill
Light ballast containing polychlorinated biphenyls (PCBs) (Mailing No. 1, p. 000420)	11-55 gal drums	1994	Laidlaw Env. Services
Asbestos removed from the tempering oven during oven repair (Mailing No. 1, p. 000423)	1-55 gal drum	1996	North East Environmental
Lead and oil waste generated during oil removal from the quench tanks (Mailing No. 1, p. 000438)	5-55 gal drums	1996	Solvents & Petroleum

Notes:

1. Weights and volumes were obtained from Camillus Cutlery's Mailings No. 1 (pp. 000011-000441) and No. 2 (pp. 2-5) except as noted in Note 3 below. Annual quantities unless otherwise noted.
2. 1968, as listed in this table column, is the approximate date when the on-site landfill was capped (i.e., parking lot construction was completed). The date Camillus Cutlery began disposing charcoal/lead and corncob/lead to the on-site landfill was not indicated. Site operations commenced 1876.
3. These values were obtained by averaging the disposal quantities from the more recent documented shipments listed in this table. Camillus Cutlery stated on pages 2-3 of their Mailing No. 2 that averages of these values may be used to determine past volume. When two shipments to different vendors were made for one year, then both values were included in the averaging calculation for that year.
4. The later years in these time period ranges are approximations inferred from Camillus Cutlery's submittal, and were not specifically indicated by Camillus Cutlery. They represent one year prior to the dates of the first submitted hazardous waste shipment documents for each of these wastes.

as both 440 gallons in the summary (Mailing No. 1, p. 000129) and 990 gallons in the hazardous waste manifests (Mailing No. 1, pp. 000155-000157, 000472). In 1993, the quantity of solvents reported to have been disposed by Safety Kleen in Mattydale, New York, was listed as both 622 gallons in the summary (Mailing No. 1, p. 000129) and an amount that was calculated to be greater than 1,100 gallons based on the manifests (some manifests are illegible) (Mailing No. 1, pp. 000162-000183);

- The quantity of corncob and lead waste generated during the heat treatment and drying process that was disposed by North East Environmental in Canastota, New York in 1993 is listed in the summary as 300 pounds (Mailing No. 1, p. 000026) and 3,200 pounds in the 1993/1994 hazardous waste reports (Mailing No. 1, pp. 000451, 000461), and by volume as 8 yards in the manifests (Mailing No. 1, pp. 000041-000043);
- Three years of waste shipments (1994, 1995, and 1996) composed of wash water, rinse water, and oil residue were summarized in Mailing No. 1 on page 000218, with the supporting manifests on pages 000221-000238. The following are discrepancies with these data. The 1995 shipment to Clean Harbor in Syracuse, New York, was noted as being both 6,070 gallons in the summary (Mailing No.1, p. 000218) and 6,195 gallons based on the manifests (Mailing No. 1, pp. 000225-000232, 000236). The disposal facility for the 1996 shipment of 2,520 gallons was noted as being Solvents & Petroleum in the summary (Mailing No. 1, p. 000218) and Environmental Products & Services in the manifests (Mailing No. 1, pp. 000221-000222). Both of these facilities are located in Syracuse, New York;
- On page 000415 of Mailing No. 1, it was noted that a "Trichlor" shipment of 25 gallons was made in February 1996, and that this waste stream was in existence from 1990 until the time of the submittal which was in September 1996. It is unclear from the submittal whether a total of 25 gallons was produced over a six-year period, or

only during 1996. The value included in Table 1 herein assumes a one-time shipment of Trichlor to Solvents & Petroleum; and

- The following outgoing waste solvent shipments were noted in the NYSDEC Hazardous Waste Regulatory Fee Information forms and Hazardous Waste Reports submitted in Mailing No. 1 (Mailing No.1, pp. 000443-000475). However, they were not accounted for in either the provided hazardous waste manifests or the generated waste summary tables (Mailing No.1, pp. 000010-000441). These include: 4,855.8 pounds of spent solvents and oils in 1995 (Mailing No.1, p. 000448); 12,865.0 pounds of spent oils and cleaning liquids in 1994 (Mailing No.1, p. 000453); 3,979.8 pounds of spent solvents and oils in 1994 (Mailing No.1, p. 000454); 6,389.3 pounds of spent solvents and oils in 1993 (Mailing No.1, p. 000454); and 5,276.0 pounds of spent solvents and oils in 1993 (Mailing No.1, p. 000459).

<u>Wastes Recycled or Disposed Out of Basin</u>

The waste streams listed below are the wastes that were described in Camillus Cutlery's submittal which were either recycled or were disposed outside of the Onondaga Lake watershed. The referenced reports, dated between 1987 and 1996, were contained in Camillus Cutlery's submittal. The scrap metal information below was taken from USEPA Form 'R' Toxic Chemical Release Inventory Reporting Forms that were provided on pages 000377-000399 of Mailing No. 1. In these USEPA forms, the fate of scrap metals that contained copper and/or chromium generated at Camillus Cutlery was noted.

- Empire Recycling Corp. in Utica, New York in Oneida County was a site used for the scrap metal processing and recycling of copper (Mailing No. 1, pp. 000350, 000386). Landfilling of this waste was not conducted at this facility;

- Scrap metal shipments containing copper and chromium were landfilled or recycled at the High Acres Landfill & Recycling Center in Fairport, New York in Monroe County (Mailing No. 1, pp. 000312, 000321);
- Scrap metal shipments containing copper were landfilled or recycled at the Olin Corporation in East Alton, Illinois (Mailing No. 1, p. 000331);
- Seneca Meadows, Inc. in Waterloo, New York in Seneca County was used for landfilling scrap metal shipments containing copper and chromium (Mailing No. 1, pp. 000387, 000396);
- Ballasts containing PCBs were landfilled at Chem Waste Management in Model City, New York in Niagara County (Mailing No. 1, p. 000421);
- Lead and oil waste was recycled at Solvents & Petroleum in Syracuse, New York (Mailing No. 1, p. 000438). Waste recycling was conducted at this facility;
- Swarf shipments were sent to the Seneca Meadows Landfill or the High Acres Landfill (Mailing No. 1, pp. 000047-000101). Both of these landfills are not within the Onondaga Lake watershed. The swarf was noted in a chemical analysis (Mailing No. 1, pp. 000048-000049) to be below TCLP regulatory limits for all herbicides, pesticides, semi-volatiles, metals, and volatiles;
- Shipments of oil/water mixtures were made to Solvents & Petroleum and Clean Harbor (Mailing No. 1, pp. 000218-000238). The mixture was noted in a chemical analysis (Mailing No. 1, p. 000219-000220) to contain the following select metals: chromium, lead, molybdenum, phosphorus, zinc, and also had an oil/grease concentration of 4,400 mg/L. This material was recycled at these sites; and
- An asbestos shipment to Northeast Environmental in Canastota, New York, in Madison County, was treated in 1996. A chemical analysis revealed the asbestos contained 23% chrysotile (Mailing No. 1, p. 000424).

Facility Permits

Camillus Cutlery stated that they did not cause any unpermitted releases of hazardous wastes, hazardous substances, or industrial wastes into the environment (Mailing No. 1, p. 000485). Permits have been obtained for air emissions (NYSDEC), cooling water discharge to Ninemile Creek (NYSDEC), and for two industrial waste streams discharged into the sanitary sewer (OCDDS). These permits are discussed below.

Two NYSDEC Certificates to Operate Air Contamination Sources, as well as a permit extension through May 15, 2001, were submitted in Mailing No. 1 (Mailing No.1, pp. 000495-000503) which permit emissions from the facility's heat treating quench oil tanks and from the vat of molten lead that is covered with charcoal. There are three permitted air emission points which were not located on a site map. The contaminants with permit limitations are miscellaneous organics, lead, and oil mist.

As noted earlier, the facility was issued SPDES permits from 1983 through 1993 (Mailing No. 1, pp. 000507-000510, 000513-000516) for the discharge of coolant water into Ninemile Creek. The water was used to cool facility air compressors (Outfall No. 1) and oil quenching tanks (Outfall No. 2). Effluent limitations were set for discharge flow (3,000 gallons per day [gpd] per outfall), temperature (less than 90°F), and pH (6 to 9 range). In 1991, water was recycled for the purposes of cooling and parts washing. As of October 28, 1991, the SPDES permit was deemed to be no longer necessary and was discontinued (Mailing No. 1, p. 000505).

There are two permitted waste streams from the facility to the OCDDS sanitary sewer system. The most recent OCDDS Industrial Waste Discharge Permit that was submitted was valid through July 15, 1998 (Permit No. 56, Mailing No. 1, pp. 000518-000550).

The first waste stream consists of process water used in the barreling process (i.e., burr removal, washing, and polishing) as well as barrel cooling water. To comply with the OCDDS permit dated September 1981 to September 1984 (Mailing No. 1, pp. 000614-000619), a filter known as a "Flex-Tube" Filter was installed in the spring of 1982 to improve the removal of sludge and iron. The barrel operation wastewater is accumulated in a closed system which flows through a pre-treated filter and is then discharged through Sewer No. 1 into the sewer system. Based on Camillus Cutlery's June 7, 1996 Self-Monitoring Report (Mailing No. 1, p. 000565), the filter system typically treats approximately 973,000 gallons of water every six months. The Flex-Tube system uses diatomaceous earth as a filtration medium, which is circulated as a powder through the filter tube system by a closed loop fluid circuit. The powder agglomerates onto the surface of the flexible filter septum, forming a coating or cake that will trap solid particles as small as 0.5 microns (Mailing No. 1, pp. 000488-000491). A favorable OCDDS review of the Flex-Tube Filter's performance was submitted with Mailing No. 1 on page 000487. OCDDS Notices of Violation (NOVs) are discussed in Section 3.5.

The second waste stream consists of sanitary waste and also, until 1993, wash/rinse wastewater with oil residue from the facility's wash tank (OCDDS Permit No. 56 included in Mailing No. 1, pp. 000604-000613). The waste was discharged to the sewer system through the facility's Sewer No. 2. In 1994, a NOV was received citing high concentrations of oil and grease in the wash/rinse waste. The problem was corrected by re-piping a piece of equipment and removing the wash tank's residual oil (Mailing No. 1, p. 000485). To further limit the residual oil concentration in this waste stream, Clean Harbor of Syracuse, New York and Solvents & Petroleum have been contracted since 1994 to remove the facility's wash tank wash/rinse water instead of directly discharging it to the sanitary sewer (Mailing No. 1, p. 000218).

3.0 POTENTIAL PATHWAYS FOR RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM

3.1 Soil

Soil on the Camillus Cutlery site can be contaminated directly from on-site disposal of manufacturing wastes, spills from waste storage and handling areas, or from migrating materials from their on-site landfill. Camillus Cutlery indicated that there have been no unpermitted spills or releases at their facility (Mailing No. 1, p. 000485). Camillus Cutlery did not provide any analytical soil data for this site.

Land was purchased by Camillus Cutlery for the purpose of waste disposal to the north of their processing facility. The date this land was purchased was not specified, but was noted as being "much into the past" (Mailing No. 2, p. 2). The types of waste that were landfilled at this location (as noted in Mailing No. 2) consisted of lead and charcoal, lead and corncob, corncob and oil, trichloroethene residual sludge, pickling waste, and solvent tank sludge. In 1968, the landfilling was stopped and the last part of the landfill area was made into additional parking lot areas. The parking lot still exists today and the footprint of the landfill area is shown on the site map provided in Camillus Cutlery's third submittal. The current condition of the parking lot was not indicated by Camillus Cutlery. Pavement and landfilling specifications, and an engineering description of the landfill area were also not provided as requested in the September 22, 1997 NYSDEC/USEPA Joint Request for Additional Information. As noted earlier, a portion of the landfill area is situated underneath a grassed area (Mailing No. 3).

In the event that the landfill capping was not done satisfactorily, has been damaged, or has otherwise been deteriorated in some way, there is a potential for the transport of landfilled contaminants into nearby Ninemile Creek or to the storm sewer system by erosion due to surface water runoff and dusting during dry, windy conditions. Subsurface soil contamination can also be transported to the lake system via dissolution and subsequent groundwater migration to the lake or its tributaries (Ninemile Creek). It was not indicated in their submittal whether a subsurface protective layer was applied to the waste in the landfill area that is covered by grass. If an impermeable layer was not applied, the risk of off-site contamination is greatly increased.

The wastes listed below were disposed in the on-site landfill prior to 1968. The waste information was obtained from recent hazardous waste manifests, chemical analyses, and MSDS (submitted in Mailing No. 1) for the wastes that were landfilled on-site. The referenced reports were contained in Camillus Cutlery's submittal and dated between 1987 and 1996. However, this more recent information will still be considered applicable for wastes landfilled before this time period because the knife manufacturing "operation has not changed over the years" (Mailing No. 1, p. 000003) other than a varying customer demand resulting in a changing quantity of individual waste types generated (Mailing No. 1, p. 000008).

- Charcoal and lead waste from the heat treatment process. This waste was noted in a chemical analysis (Mailing No. 1, p. 000012) to contain the following select metals from a Toxicity Characteristic Leaching Procedure (TCLP) test: barium, cadmium, chromium, copper, lead, nickel, and zinc, with a pH of 10.21. The detected concentration of lead (420 mg/L) exceeded the current TCLP standard (5 mg/L) as per 40 CFR 261;
- Lead and corncob waste from the heat treatment drying process. It was noted in a chemical analysis (Mailing No. 1, p. 000027) that this waste contains the following select metals: barium, copper, lead, nickel, and zinc, with a pH of 6.14. The concentration of lead (244 mg/L) exceeded the TCLP standard;
- Corncob and oil waste from the drying of parts. This waste was noted in a chemical analysis (Mailing No. 1, pp. 000103-000104) to be below regulatory limits for all herbicides, pesticides, semi-volatiles, metals, and volatiles by TCLP testing. The pH

of this waste was 6.7. Lead was detected at a concentration (1.7 mg/L) less than the TCLP standard;

- Solvents from parts washers and waste oil, or mixtures of the two. Two MSDS were submitted for the solvents including Naphtha (Varsol #1) and SPS Rust Check 1240 (Mailing No. 1, pp. 000130-000136) which were found to be 100% volatile and flammable, and can cause irritation if inhaled or if there is bodily contact. The occupational exposure limit is 100 ppm per the manufacturer's recommendation;
- Sludge containing trichloroethene (Mailing No. 2, p. 3); and
- Waste from the pickling operation. This waste was composed of steel scale, dirt, grime and residue hydrochloric acid (Mailing No. 2, p. 3).

Chemical analyses were conducted for the charcoal and lead waste (June 21, 1993), corncob and lead waste (June 21, 1993), and corncob and oil waste (May 28, 1991 and August 8, 1991). These data were provided in Mailing No. 1, pages 000012, 000027, and 000104, respectively. The TCLP metals data for these samples along with the current standards are summarized in Table 2.

3.2 Surface Water

The Camillus Cutlery facility is located approximately 100 feet west of Ninemile Creek. A concrete wall of unspecified dimensions serves as a barrier between the facility's property and the creek (Mailing No. 1, p. 000004). The site is located approximately seven miles upgradient of Onondaga Lake, as shown on Figure 1 herein.

Hand-drawn locations of facility Outfalls No. 1 and No. 2 are sketched on the site map dated 1978 (Mailing No. 1, p. 000004), as well as portions of a drainage system. It does not appear that the site map's representation of the drainage system is complete or has been recently updated. Two drains are shown on the site map provided in the third submittal with an

Table 2: TCLP Metals Concentrations for Three Types of Camillus Cutlery Wastes

Metals	Charcoal and Lead Waste Concentration (mg/L)	Corncob and Lead Waste Concentration (mg/L)	Corncob and Oil Waste Concentration (mg/L)	TCLP Standard (mg/L)
Arsenic	ND	ND	0.05	5.0
Barium	3.75	0.564	0.5	100.0
Cadmium	0.027	ND	.021	1.0
Chromium	0.214	ND	.18	5.0
Copper	0.041	1.28	—	—
Lead	420	244	1.7	5.0
Mercury	ND	ND	ND	0.2
Nickel	0.808	0.265	—	—
Selenium	ND	ND	ND	1.0
Silver	ND	ND	ND	5.0
Zinc	0.096	2.81	—	—

Sources: Mailing No. 1, pp. 000012, 000027, 000104, and 40 CFR 261.

unknown discharge point. Camillus Cutlery did not indicate the period of time these drains were operational or whether the drains exposed stormwater to landfill waste, thereby creating contaminated leachate. The locations of the storage facilities, including the collection system "located out side [sp.] the factory" that was used to accumulate vacuumed solids and dust coming from the numerous facility "dry grinding, buffing and polishing wheels" (Mailing No. 2, p. 5), were not identified on the site maps that were submitted. It is possible that on-site discharges from these areas could reach Ninemile Creek via surface water runoff. The types of storage containers were noted on page 000009 of Mailing No. 1, and include 55-gallon drums, rolloff boxes, and covered hoppers. The loading/unloading areas for incoming and outgoing shipments are also potential sites for spills. Contaminants in surficial soil may be transported to Ninemile Creek in surface runoff directly or via the facility's storm drain system. The migration of contaminated groundwater is also a potential pathway of contamination to the creek and Onondaga Lake.

As noted earlier, the facility was issued SPDES permits from 1983 through 1993 (Mailing No. 1, pp. 000507-000510, 000513-000516) for the discharge of coolant water into Ninemile Creek. The permits were discontinued as of October 28, 1991 due to the implementation of a water recycling system. The site map shows two outfalls into Ninemile Creek, just downstream of Main Street. Piping connections into the facility are not shown. The SPDES permits set a daily discharge limitation of 6,000 gallons for the two outfalls combined.

The only details of stormwater runoff quality were provided in a 1990 self-monitoring report (Mailing No. 1, p. 000512) including measurements of flow, temperature, and pH. Flow readings indicate that average discharges in eleven of the twelve months exceeded the flow limit (3,000 gpd) at Outfall No. 1 (cooling water - air compressor). The flow limit at Outfall No. 2 (cooling water - quench tanks) was exceeded during one of the twelve months. There were also numerous exceedances of the temperature limitation at Outfall No. 1 during this period. Surface water and sediment data from Ninemile Creek were not provided by Camillus Cutlery.

On October 22, 1997, two surface sediment samples (top six inches) were collected by NYSDEC from Ninemile Creek, approximately 1,500 ft downstream of Genesee Street (1,000 ft downstream of Newport Road) (Sample N101) and 1,500 ft upstream of Genesee Street (Sample N102), during a one-time sampling event. Based on the landfill footprint provided in Camillus Cutlery's third mailing and the Camillus Cutlery site map (Mailing No. 1, p. 000004), the most upstream (southernmost) portion of the landfill appears to begin at approximately 350 ft downstream (north) of Genesee Street, thereby making the Sample N101 location downstream of the landfill, and the Sample N102 location upstream of the landfill. The concentrations of inorganics measured at these two sample locations did not vary significantly except for copper which was detected at 64.4 mg/kg (downstream sample) and 14 mg/kg (upstream sample). Volatile organics, semi-volatile organics, pesticides, and PCBs were either not detected in these two samples or were detected at low concentrations (e.g., less than 240 μg/kg for select PAHs).

3.3 Groundwater

No groundwater sample data was provided for this site. Groundwater beneath the Camillus Cutlery site can be contaminated directly from leaching of contaminants from the on-site landfill. Camillus Cutlery stated that there have never been any unpermitted spills or discharge incidents to the best of their knowledge (Mailing No. 1, p. 000485). It could therefore be inferred that the landfilled on-site material is this facility's only potential source of groundwater contamination by way of leaching. Although it was not specifically mentioned in the submittals, since the landfill capping was completed over thirty years ago, in 1968, it can be assumed that it was not lined and there is no leachate collection system in place. The third mailing's site map shows two drains located in the landfill area. If these drains were operational and exposed stormwater to waste, then they would be another potential source of groundwater contamination through leachate. This map also shows a grassed area overlying the landfill area, and not an impermeable cover. If there is, in fact, no cover on this part of the landfill, then this would be another likely source of groundwater contamination by the downward movement of leachate.

3.4 Air

Air emissions represent a local source of contaminants to the atmosphere with potential deposition to the ground surface and subsequent transport to Ninemile Creek via surface runoff. On page 5 of Mailing No. 2, Camillus Cutlery stated that prior to the 1970s, dust and other solids were lifted off an on-site collection area that was used to store vacuumed materials from grinding, buffing and polishing wheels, and then became deposited into Ninemile Creek and the surrounding area. Material from the on-site landfill (assuming there was no daily cover) could have also been a source of contamination to the atmosphere prior to 1968. Contaminants in surface soil at the site can also be transported to the atmosphere as a dust.

Air emission test results were provided in the facility's NYSDEC Certificate to Operate an Air Contamination Source Renewal Application (Mailing No. 1, pp. 000495-000503). Results from 1980 indicate "trace" amounts of miscellaneous organics, oil mist, and lead. Three emission points were noted in the air permit (expiration date is May 15, 2001) which were not indicated on the facility site map.

3.5 County Sewer System

Camillus Cutlery currently discharges industrial wastewater and sanitary wastewater through Sewer No. 1 and Sewer No. 2, respectively, to the OCDDS system for treatment at the Metropolitan Syracuse Wastewater Treatment Facility. It was not noted when the sewer discharges began. The 1981-1984 OCDDS permit (Mailing No. 1, p. 000614) indicates that this discharge was formerly treated at the Camillus Sewage Treatment Plant. The location of the piping connections from the facility to the OCDDS system was not indicated in the submittal. The site map that was submitted with Camillus Cutlery's third mailing shows a sanitary sewer situated under the landfill area. Infiltration of contaminated leachate into the sanitary sewer is a potential pathway of release of hazardous wastes into the sanitary sewer system and ultimately into the Onondaga Lake system.

A self-monitoring report from June 7, 1996, noted that the Flex-Tube Filter system treated 973,000 gallons of water over a six-month period, which was then discharged through Sewer No. 1 to OCDDS. The Flex-Tube system (described in Section 2.3) decreases sludge and iron concentrations. The June 7, 1996 report also noted that 785,000 gallons of sanitary wastewater was discharged over a six-month period (Mailing No. 1, p. 000565).

Chemical analysis reports of wastewater discharges were provided on pages 000551-000563, and 000567-000568 of Mailing No. 1. Camillus Cutlery submitted OCDDS Notices of Violation (NOVs) (Mailing No. 1, pp. 000570-000577) that were issued on July 17, 1995 and August 25, 1995 for total chromium (sample results of 10 mg/L, 46 mg/L, and 16 mg/L, with a permit limitation of 8.0 mg/L). Corrective measures consisted of trying different barrel media in the tumbling operation, which included stainless steel and carbon. Re-sampling of chromium over four days after the latest violation (August 1995) indicated that chromium levels reverted to acceptable levels ranging from 0.026 mg/L to 0.51 mg/L (Mailing No. 1, p. 000572). Regarding Camillus Cutlery's explanation for the violation and their abatement measures, the August 25, 1995 NOV (Mailing No. 1, pp. 000570-000573) refers to an August 8, 1995 Camillus Cutlery response (Mailing No. 1, p. 000572) which was not provided in their submittal.

Five NOVs were also issued between March 28, 1994 and May 26, 1995 (Mailing No. 1, pp. 000578-000603) for oil and grease violations (sample results of 594 mg/L, 581 mg/L, 190 mg/L, 365 mg/L, and 276 mg/L, with a permit limitation of 150 mg/L). Suspected causes of the violations included an oil/water mixture overflow from the facility's grinding machinery, leaks in an unspecified closed system (Mailing No. 1, p. 000588), and the facility's use of a soap which contained freon-soluble materials which registered high oil and grease concentrations. The changing of the type of soap was the most recent operation modification (Mailing No. 1, p. 000580), and it resulted in an oil/grease concentration reduction to within an acceptable range (as of 1995).

Documentation of stormwater discharge practices was not provided by Camillus Cutlery. It is possible that some stormwater runoff drains into municipal storm sewers. It is also possible that industrial wastewater was historically discharged directly to the creek prior to completion of the local sewer system.

4.0 LIKELIHOOD OF RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM

4.1 Documented Releases

Documented Spills

It was indicated by Camillus Cutlery that there have been no unpermitted spills or releases at this facility to their knowledge (Mailing No. 1, p. 000485).

As indicated in Section 3.1, hazardous and non-hazardous wastes consisting of the following were landfilled on the facility's property prior to approximately 1968: lead waste mixed with charcoal and corncob, a corncob and oil mixture, solvent and/or waste oil mixtures, sludge containing trichloroethene, and a pickling sludge that contained hydrochloric acid residue. Camillus Cutlery did not indicate the date they began using the on-site landfill. The wastes that were disposed in the on-site landfill are summarized in Table 3 based on submitted data that was dated between 1987 and 1996, with the assumption that the average annual quantities have not changed significantly. Five hazardous wastes listed in Table 1 have been included in Table 3, in addition to the non-hazardous corncob and oil mixture. It should be noted that the information regarding the types and approximate quantities of waste that were disposed at the on-site landfill was obtained from Camillus Cutlery's Mailing No. 2.

Ongoing/Recent Releases

As discussed in Sections 3.4 and 3.5, ongoing releases from the site include releases to the atmosphere from air emission sources, as well as the discharge of treated process wastewater and sanitary wastewater into the OCDDS system. A SPDES permit for this facility has not been needed since October 28, 1991.

Table 3: Summary of the Wastes Disposed in the On-Site Landfill

Waste Type	Estimated Annual Quantity	Years of Disposal[2]
Charcoal and lead waste from the heat treatment process (Mailing No. 2, p. 2)	4,200 lbs[1]	? - 1968
Corncob and lead waste from the heat treatment drying process (Mailing No. 2, p. 2)	1,850 lbs[1]	? - 1968
Corncob and oil (non-hazardous) used for parts drying (Mailing No. 2, p. 2)	12,074 lbs[1]	? - 1968
Pickling sludge (Mailing No. 2, p. 3)	260 gals	1940-1968
Solvents from parts washers and/or spent oil (Mailing No. 2, p. 3)	660 gals[1]	1950-1968
Trichloroethene generated during cleaning operations (Mailing No. 2, p. 3)	780-1,040 gals	1941-1951

Notes:

1. These values were obtained by averaging the disposal quantities from the more recent documented shipments listed in Table 1. Camillus Cutlery stated on pages 2-3 of their Mailing No. 2 that averages of these values may be used to determine past volume. When two shipments of the same waste type to different vendors were made for one year, then both values were included in the averaging calculation for that year.
2. 1968, as listed in this table column, is the approximate date when the on-site landfill was capped (i.e., parking lot construction was completed). The date Camillus Cutlery began disposing wastes to the on-site landfill was not indicated. Site operations commenced in 1876.

4.2 Threat of Release to the Lake System

4.2.1 Extent of Site Contamination

Based on the material submitted, the only site contamination exists in the on-site landfill area which currently is partially covered by the facility's parking lot. It was stated in the submittal that the landfill property was purchased by Camillus Cutlery explicitly for the purpose of landfilling (date was not specified). Based on the landfill footprint provided in Camillus Cutlery's third mailing and the Camillus Cutlery site map (Mailing No. 1, p. 000004), the landfill footprint area is less than one acre in size and extends to the shore of Ninemile Creek. The company has not provided any sampling data from the on-site landfill (e.g., waste cores, surrounding soil borings, groundwater sample results, or upgradient and downgradient surface water and sediment sample results from Ninemile Creek).

On October 22, 1997, two surface sediment samples were collected by NYSDEC from Ninemile Creek, approximately 1,500 ft downstream of Genesee Street (1,000 ft downstream of Newport Road) (Sample N101) and 1,500 ft upstream of Genesee Street (Sample N102), during a one-time sampling event. The southernmost, most upstream, edge of the on-site landfill is approximately 350 ft north of Genesee Street (Mailing No. 3), which makes the relative location of the on-site landfill upstream of Sample N101 and downstream of Sample N102. The only significant difference between the two sediment samples collected was that the downstream station had a higher copper concentration (64 mg/kg) than the upstream station (14 mg/kg). The NYSDEC "Lowest Effect Level" (LEL) standard for copper in sediment is 16 mg/kg which indicates that at the Ninemile Creek Station (N101) downstream of the site, "sediment is considered contaminated" by NYSDEC standards (NYSDEC, 1999, Table 2). The downstream copper concentrations is less than the "Severe Effect Level" (SEL) of 110 mg/kg.

A description of the disposed waste was made possible because Camillus Cutlery stated that the composition of their wastes produced has not significantly varied with time. Based on the data in Table 3 (with the assumptions noted in Section 2.3), approximately 18,000 pounds and 1,800 gallons of hazardous/industrial wastes were disposed into the on-site landfill on an annual basis. It should be noted that volumetric approximations were not available for all wastes, it is unknown how much soil was mixed in or was added as a final sub-pavement layer, and it was not specified when the land was first used as a landfill. For these reasons, it is not possible to estimate either the total volume of landfilled waste or the disposal area dimensions.

Groundwater

Although groundwater tests were not conducted, it is expected that the presence of the un-lined, on-site landfill that has not been used for approximately thirty years, and operated for an unknown number of years prior to 1968, has contaminated the groundwater beneath the Camillus Cutlery site by the leaching of contaminants. Analytical soil data and geotechnical information were not submitted. The depth to the water table and the direction of groundwater flow were not indicated. If the groundwater flow is consistent with surface contours (see Figure 2), then surficial groundwater will be moving approximately west to east, toward Ninemile Creek, and possibly providing recharge for the creek.

Surface Water

There was one set of surface water sampling results provided for this site at Outfalls No. 1 and 2 to Ninemile Creek. Surface water and sediment data from Ninemile Creek were not provided by Camillus Cutlery although, as discussed earlier in this section, NYSDEC collected two sediment samples in 1997 in Ninemile Creek near the Camillus Cutlery facility, upstream and downstream of the site and Genesee Street. The SPDES permit limitations that were in place from October 1, 1983 to October 28, 1991 governed the effluent flow rate, temperature, and pH at Outfalls No. 1 and 2. However, based on the limited monitoring data provided, the permit limits were exceeded on numerous occasions.

The discharges through Outfalls No. 1 and 2 were each limited to 3,000 gpd, a maximum temperature of 90°F, and a pH between 6.0 and 9.0. Sampling at the outfalls was to be conducted on a monthly basis. It should be noted that only one sampling period's monitoring report was submitted (January 1990 to December 1990). Flow rate monthly averages were greater than the allowable 3,000 gpd for 12 of the 24 monthly readings at the two outfalls with a maximum monthly average of 5,555 gpd from Outfall No. 1 in December 1990 (Mailing No. 1, p. 000512). The temperature limitation of 90°F was also exceeded during six of the eleven months monitored at Outfall No. 1, with a maximum reported temperature of 121°F in May 1990. Notices of these violations from NYSDEC were not provided, and it was not indicated whether any operational changes were implemented to limit the effluent flow levels and to reduce the effluent temperature.

The impacts of the on-site landfill and contaminated stormwater runoff on Ninemile Creek cannot be assessed without water quality data, but a detrimental effect can be assumed if there is leaching from the landfill or exposed areas of waste. Based on the submitted site maps, the landfill area does not seem to have any physical barriers situated between it and Ninemile Creek. As requested in the September 22, 1997 NYSDEC Request for Additional Information, an engineering description of the land disposal area was not provided.

Sewer Discharges

As stated in Section 2.3, sanitary waste, process wastewater, and barrel cooling water have been discharged to the OCDDS system. Wastewater data from Sewer No. 1 (barrel operation wastewater) and Sewer No. 2 (sanitary wastewater) were provided for a four-day period

(May 7 - 10, 1996) (Mailing No. 1, pp. 000551-000563). There were no reported violations of the OCDDS permit during this four-day period.

Prior to this period, elevated total chromium and oil/grease concentrations were the only permit violations (based on information provided) that prompted OCDDS to issue NOVs to Camillus Cutlery. Discharge effluent violations were cited for elevated total chromium concentrations in Sewer No. 1 of 10 mg/L (July 25, 1995), 16 mg/L (May 23, 1995), and 46 mg/L (May 22, 1995), with an allowable concentration of 8 mg/L. Using the maximum concentration of 46 mg/L and an average flow from Sewer No. 1 of 7,400 gpd (based on a six-month flow of 973,000 gallons [Mailing No. 1, p. 000565], and assuming 22 working days per month), an estimate of the chromium loading to the sanitary sewer would be 3 pounds/day. Elevated oil and grease concentrations that were recorded were 276 mg/L (February 14, 1995), 365 mg/L (October 11, 1994), 190 mg/L (June 7, 1994), 581 mg/L (April 11, 1994), and 594 mg/L (February 11, 1994), with an allowable concentration of 150 mg/L. Each of these exceedances were for samples from Sewer No. 1, except for a sample collected on February 11, 1994 (594 mg/L) from Sewer No. 2. Using the maximum oil and grease concentration of 594 mg/L and an average flow from Sewer No. 2 of 6,000 gpd (based on a six-month flow of 784,589 gallons [Mailing No. 1, p. 000565], and assuming 22 working days per month), an estimate of the oil and grease loading would be 30 pounds/day.

Elevated chromium and copper loadings were also noted in the USEPA Toxic Chemical Release Inventory Reporting Forms. The annual chromium loading to the OCDDS system was estimated at 14 pounds/year in 1995, and between 11 and 499 pounds/year from 1991 through 1994 (Mailing No. 1, pp. 000307-000399). For copper, it was estimated that 5 pounds/year was discharged to the sewer in 1995 (Mailing No. 1, p. 0000311).

4.2.2 Migration Potential of Contaminants

The known contaminants of concern based on the discharges into the county sewer system include metals, such as chromium, copper, and lead. Based on the information provided, OCDDS Notices of Violation were received for total chromium, but not for copper or lead. Changing the barreling operation media from stainless steel to carbon changed the effluent's total chromium levels to within acceptable limits as of 1995 (Mailing No. 1, p. 000572).

Of all the waste generated at the facility, the wastes disposed to the on-site landfill have the greatest potential for migration into groundwater and the lake system. If the landfill cap is not of adequate quality and waste is exposed, then there is also a potential for contaminant migration via surface water runoff and dusting. Lead presents the greatest concern when considering the landfilled wastes (see Table 2). The oil and corncob mixture had a TCLP lead concentration of 1.7 mg/L (regulatory limit 5.0 mg/L) based on a July 8, 1991 chemical analysis. TCLP testing in June 1993 of the corncob and lead waste and the charcoal and lead waste resulted in lead concentrations of 244 mg/L and 420 mg/L, respectively. These TCLP exceedances suggest that the wastes disposed in the on-site landfill have a high (unacceptable) leaching potential.

5.0 POTENTIAL FOR ADVERSE IMPACTS TO LAKE SYSTEM DUE TO A RELEASE OR THREAT OF A RELEASE

5.1 Hazardous Substance Characteristics

Several different contaminants have been detected in wastes produced by Camillus Cutlery, including chromium, copper, and lead. The pathways of release for these contaminants to Onondaga Lake include the OCDDS municipal sewer system, surface water runoff to Ninemile Creek, air emissions, wind transport of exposed particulate waste, and the leaching of pollutants from the on-site landfill into groundwater.

As noted previously, both subsurface data (e.g., soil boring results, groundwater sampling results, landfill waste sampling) and a detailed description of the on-site landfill were not provided, and there is only a limited amount of waste quality data. Based on the information provided by Camillus Cutlery (e.g., outfall sampling results, chemical analyses of some of their generated hazardous wastes), three likely contaminants of concern have been identified (chromium, copper, and lead). However, further investigations should be conducted to completely characterize the area of contamination on the Camillus Cutlery property. Notably, the presence of trichloroethene, a chlorinated solvent denser than water that was disposed in the on-site landfill, should be investigated. It was indicated that as much as fifteen to twenty gallons per week of degreasing waste containing an unspecified percentage of trichloroethene was disposed over a ten-year period (Mailing No. 2, p. 3). However, a chemical analysis of this waste was not provided.

A discussion of hazardous substance characteristics for the primary contaminants of concern is provided below.

Mobility

In aqueous systems, chromium exists in two oxidation states: trivalent, or Cr(III), and hexavalent, or Cr(VI) (USEPA, 1979). The trivalent form is generally insoluble in water whereas the hexavalent form is quite soluble. The fate and mobility of chromium in sediment and soil is dependent on pH, redox potential, and sorption characteristics of the soil. The reduction of Cr(VI) to Cr(III) is facilitated by low pH (US Dept. of Health and Human Services, 1991). Chromium in soil is predominantly in the trivalent form and as an insoluble oxide. It is therefore not very mobile in soil (US Dept. of Health and Human Services, 1991). Also, chromium in soil can be transported to the atmosphere as an aerosol or dust, or can be transported via surface runoff to receiving waters in soluble or bulk precipitate form. Chromium in soluble and unadsorbed complexes in soil can leach into groundwater, depending upon soil pH (US Dept. of Health and Human Services, 1991).

The mobility of copper in freshwater is strongly dependant on pH, Eh and the occurrence of potential surfaces such as organic matter and other clay mineral species. Copper has a strong affinity for the hydrous iron and manganese oxides, clays, carbonate minerals and organic matter. Sorption to these materials results in the relative enrichment of the bed sediments and the reduction of copper in the dissolved phase. The sorption of copper to other materials effectively results in the removal of copper from the water column and greatly inhibits copper's mobility in the environment. In polluted waters, studies have indicated that the controlling factor is sorption to organic minerals (USEPA, 1979).

Lead mobility in the environment is governed by a number of environmental conditions such as pH, oxidation state, and water hardness. Elemental lead (metallic lead) may also have been present. However, natural weathering is ultimately expected to oxidize any elemental lead. Lead mobility in oxidized and elemental form is expected to be controlled by the movement of lead-bearing soil particles. As a result, site lead will be associated with soil particles, and lead mobility will, in part, be governed by the same processes responsible for soil movement (i.e., surface water flow, particle size, and depositional environment). Once deposited on the creek or lake bottom, there exists the potential for reduction and remobilization of lead from the reducing sediments to the overlying waters.

Toxicity

Hexavalent chromium, Cr(VI), is classified as a human carcinogen (IRIS, 1996). Epidemiological studies of chromate facilities in the United States have found an association between chromium exposure and lung cancer. Workers are likely exposed to both trivalent chromium Cr(III) and Cr(VI), however, only Cr(VI) has been found to be carcinogenic in animals (IRIS, 1996). Chromium(VI) is also very toxic to aquatic organisms (USEPA, 1979). Exposure to high levels of Cr(III), although an essential element, via inhalation, ingestion, or dermal contact may cause serious health effects (ATSDR, 1992).

Copper is a common component of many algicides, insecticides, molluscides, and plant fungicides. It is toxic to aquatic life at high concentrations, especially the divalent copper ion and its hydroxy complexes (USEPA, 1979). In humans, copper is an essential nutrient for health. Copper is readily absorbed into the bloodstream through the stomach and small intestine. After copper requirements are met, there are several mechanisms that prevent copper overload. Excess copper is excreted from the body. However, high concentrations of ingested copper can cause stomach cramps, nausea, and induce vomiting and/or diarrhea. Copper is not considered either a carcinogen or a possible carcinogen.

Lead may adversely affect survival, growth, reproduction, development, and metabolism of most species under controlled conditions, but its effects are substantially modified by physical, chemical and biological variables (Eisler, 1988). In general, organo-lead compounds are more toxic than inorganic lead compounds, food chain biomagnification of lead is negligible, and immature organisms are most susceptible to toxicity. Lead is classified as a probable human carcinogen, based on rat and mouse studies with dietary and subcutaneous exposure to several soluble lead salts (USEPA, 1995). In humans, ingestion of lead leads to symptoms such as loss of appetite, anemia, malaise, insomnia, headaches, irritability, muscle and joint pains, tremors, hallucination and distorted perceptions, muscle weakness, gastritis, and liver changes. Lead is also toxic to all phyla of aquatic biota, but its toxic action is modified by species and physiological state. Wong et al. (1978) reported that only soluble waterborne lead is toxic to aquatic biota, and that free cationic forms are more toxic than complexed forms.

Persistence

In surface waters, no data have been found that would indicate that photolysis, biodegradation, and volatilization of chromium are important fate processes (USEPA, 1979). Sorption and bioaccumulation are considered important aquatic fate processes. As discussed above, chemical speciation plays an important role in the fate of chromium in surface water. Conditions favorable to Cr(VI) will maintain chromium in soluble form while conditions favorable to Cr(III) will result in precipitation and partitioning to solids and to sediments (USEPA, 1979). Chromium is not considered as persistent in surface water compared to soil and sediment.

Both copper and lead are very persistent in both water and sediment. Since both copper and lead are elements, they cannot be broken down at all and their concentrations in environmental media are governed solely by dilution mechanisms. In the environment, copper and lead can be transformed from inorganic to organic forms, affecting their respective toxicity, but ultimately only dilution or removal will affect the presence of these two elements.

Bioaccumulation

Bioaccumulation of chromium in aquatic organisms and passage through the food chain has been demonstrated (USEPA, 1979). However, the chromium concentrations decrease with an increase in trophic level. Chromium is not expected to biomagnify in the aquatic food chain (US Dept. of Health and Human Services, 1991). Partitioning studies indicated that bioconcentration factors of benthic invertebrates to water are approximately 2,000 to 3,000 whereas the bioconcentration factor of benthics to sediments is less than one (USEPA, 1979). In general, chromium is accumulated in aquatic and marine biota to levels much higher than surface water, however, concentrations in biota are usually lower than sediment concentrations. Also, chromium does not biomagnify along the terrestrial food chain from soil to plant to animal (US Dept. of Health and Human Services, 1991).

As an essential nutrient, copper is strongly bioaccumulated by all plants and animals. However, data do not indicate that copper can bioaccumulate in higher organisms such as fish (USEPA, 1979).

Lead tends to bioaccumulate/bioconcentrate within living organisms. However, there is no convincing evidence that it is biomagnified through food chains (Wong et al., 1978; USEPA, 1979; Settle and Patterson, 1980). In surface water, lead concentrations are usually highest in benthic organisms and algae and lowest in upper trophic level predators.

5.2 Quantity of Substances

Estimates of the quantities of hazardous and non-hazardous wastes disposed to on-site soils are contained in Table 3 and descriptions of these wastes are provided in Section 2.3 and Table 2 of this Site Summary Report. The approximate quantities of hazardous wastes that have been disposed in the on-site landfill (e.g., lead-contaminated wastes) were based on recent disposal information from the last ten years, as noted in Table 1 herein. As noted earlier, average annual quantities from more recent years were used to estimate historic disposal quantities to the on-site landfill.

5.3 Levels of Contaminants

The extent of on-site contamination was discussed in Section 4.2. Analytical data provided by Camillus Cutlery include: one year of data for cooling water discharges to Ninemile Creek; data from a four-day wastewater sampling event in Sewer No. 2 prior to discharge to the OCDDS system; limited sewer monitoring data that resulted in OCDDS Notices of Violation; estimates of copper and chromium loadings to the sewer system from USEPA Toxic Chemical Release Inventory Reporting Forms; and TCLP testing results from samples of the waste products.

The outfall sampling in 1990 detected temperature and flow violations of the SPDES permit that the facility had between October 1, 1983 through October 28, 1991 (Mailing No. 1, p. 000512). Temperatures as high as 121°F and flows of 5,555 gpd were measured (permit levels were 90°F and 3,000 gpd).

Chromium was detected in discharges to the OCDDS system in Sewer No. 1 at a concentration (46 mg/L) above the regulatory level (5 mg/L) (Mailing No. 1, p. 000574). This corresponds to an approximate loading of 3 pounds/day. Oil and grease were also detected in discharges to the OCDDS system at concentrations (maximum of 594 mg/L) above the regulatory level (150 mg/L) in both Sewers No. 1 and 2 (Mailing No. 1, p. 000599). This corresponds to an approximate loading of 30 pounds/day. The highest chromium loadings noted by Camillus Cutlery in the submitted USEPA Toxic Chemical Release Inventory Reporting Forms was between 11 and 499 pounds/year (Mailing No. 1, pp. 000307-000399) from 1991 to 1994. The highest copper loadings noted by Camillus Cutlery in the submitted USEPA Toxic Chemical Release Inventory Reporting Forms was 5 pounds/year in 1995 (Mailing No. 1, p. 000311). It is likely that the ultimate metals loadings to the lake system would have been reduced by treatment operations at the former Camillus Sewage Treatment Plant and the current Metropolitan Syracuse Wastewater Treatment Facility.

TCLP lead concentrations of 420 mg/L and 244 mg/L (Mailing No. 1, pp. 000012, 000027) were detected in charcoal and lead waste, and in corncob and lead waste, respectively, both of which were disposed in the on-site landfill (Mailing No. 2, p. 2). The TCLP standard for lead is 5 mg/L.

Ninemile Creek sediment sampling that was conducted on October 22, 1997 by NYSDEC revealed that there was a higher copper concentration in the surface sediment downstream of the Camillus Cutlery facility (64.4 mg/kg) than upstream (14 mg/kg). Based on the sediment data, it cannot be ascertained with certainty whether this elevated copper concentration originated from the Camillus Cutlery site, from the Genesee Street area, or from another source. Concentrations of chromium and lead at both stations were less than the NYSDEC LEL standards.

5.4 Impacts on Special Status Areas

The Camillus Cutlery site is situated in an area where direct future adverse impact to protected habitats or streams is likely to occur. Ninemile Creek near the site is a Class C waterbody with C(T) standards (6 NYCRR 895.4) and, thus, is considered a "protected stream" in this area (6 NYCRR Part 608).

According to the Camillus National Wetlands Inventory map (USDOI, 1981), a federal wetland exists approximately 400 ft northeast of the Camillus Cutlery facility (downgradient along Ninemile Creek) and is designated as PFO1A (Palustrine, Forested, Broad-leaved Deciduous, Temporary). A second federal wetland is located approximately 400 ft southwest of the site (upgradient along Ninemile Creek) and is designated as PFO1E (Palustrine, Forested, Broad-leaved Deciduous, Seasonal Saturated). The two nearest New York State freshwater wetlands are approximately 800 ft northeast of the site downgradient along Ninemile Creek (CAM 32), and 600 ft southwest of the site upgradient along Ninemile Creek (CAM 33). Each of these state and federal wetland areas are located within the flow path of Ninemile Creek.

As of August 1996, the New York State "Natural Heritage Sensitive Element" nearest to the Camillus Cutlery facility was located approximately 0.4 miles northwest and upgradient of the site.

Surface water and groundwater discharges from the site to Ninemile Creek could adversely affect the downgradient wetlands. Since there was no on-site or perimeter soil or groundwater data submitted by Camillus Cutlery, further investigation is required to assess this potential source of off-site contamination.

6.0 SUMMARY OF CONCERNS

Based on the data and information provided by Camillus Cutlery and NYSDEC, the following concerns are noted:

- There has been a minimal amount of sampling at the facility which would provide information regarding the nature and extent of on-site contamination and off-site transport of contaminants. The chemical analyses that were submitted were from samples of wastewater effluent to the sanitary sewer system and from coolant water discharges to Ninemile Creek. Analytical data from soil, groundwater, in-place waste, and surface water runoff were not provided;
- It was not indicated if the industrial wastewater was historically discharged directly to Ninemile Creek prior to construction of the sewer system;
- Prior to the 1970s, Camillus Cutlery maintained an on-site collection area for stored vacuumed particles that would be transported by wind and "floated over the creek area and, therefore, may have gone into Ninemile Creek" (Mailing No. 2, p. 5). The length of time this collection area was used, and the dimensions of the storage area were not specified;
- Land disposal of lead-contaminated hazardous waste was conducted on site from an unspecified date until approximately 1968 (the facility has been operating since 1876);
- A waste containing trichloroethene of an unspecified concentration was disposed in the on-site landfill for a period of approximately ten years;
- Pickling waste was landfilled on-site as well, but no waste characterization data was provided, although the level of acidity was stated to be negligible (Mailing No. 2, p. 3);
- During the period of land disposal, it is assumed that there was no landfill liner or leachate collection system in place;
- The current condition of the landfill cap and berm, if present, was not described by

Camillus Cutlery. This could have ramifications on the potential for off-site contamination by surface water runoff and wind transport, as well as for safety at the facility. A portion of the landfill is situated under a grassed area which would provide minimal protection of the groundwater system against leachate. It was not indicated whether an impermeable subsurface cover was installed on top of the waste, below the grass surface. The two surface drains that are situated in the landfill area would also likely cause groundwater contamination if the stormwater has been exposed to landfilled waste;

- This facility is located within the vicinity of a "protected stream" and regulated wetlands. Ninemile Creek runs adjacent to the site, with only a concrete wall of unspecified dimensions and structural stability as a barrier adjacent to the plant building. There does not appear to be any barrier between the landfill area and the creek. There are wetlands upstream and downstream of the facility within the flow path of Ninemile Creek; and
- Detrimental effects of historic releases of wastewater at elevated temperatures (thermal discharge) and flow rates on conditions in Ninemile Creek near Outfalls No. 1 and 2.

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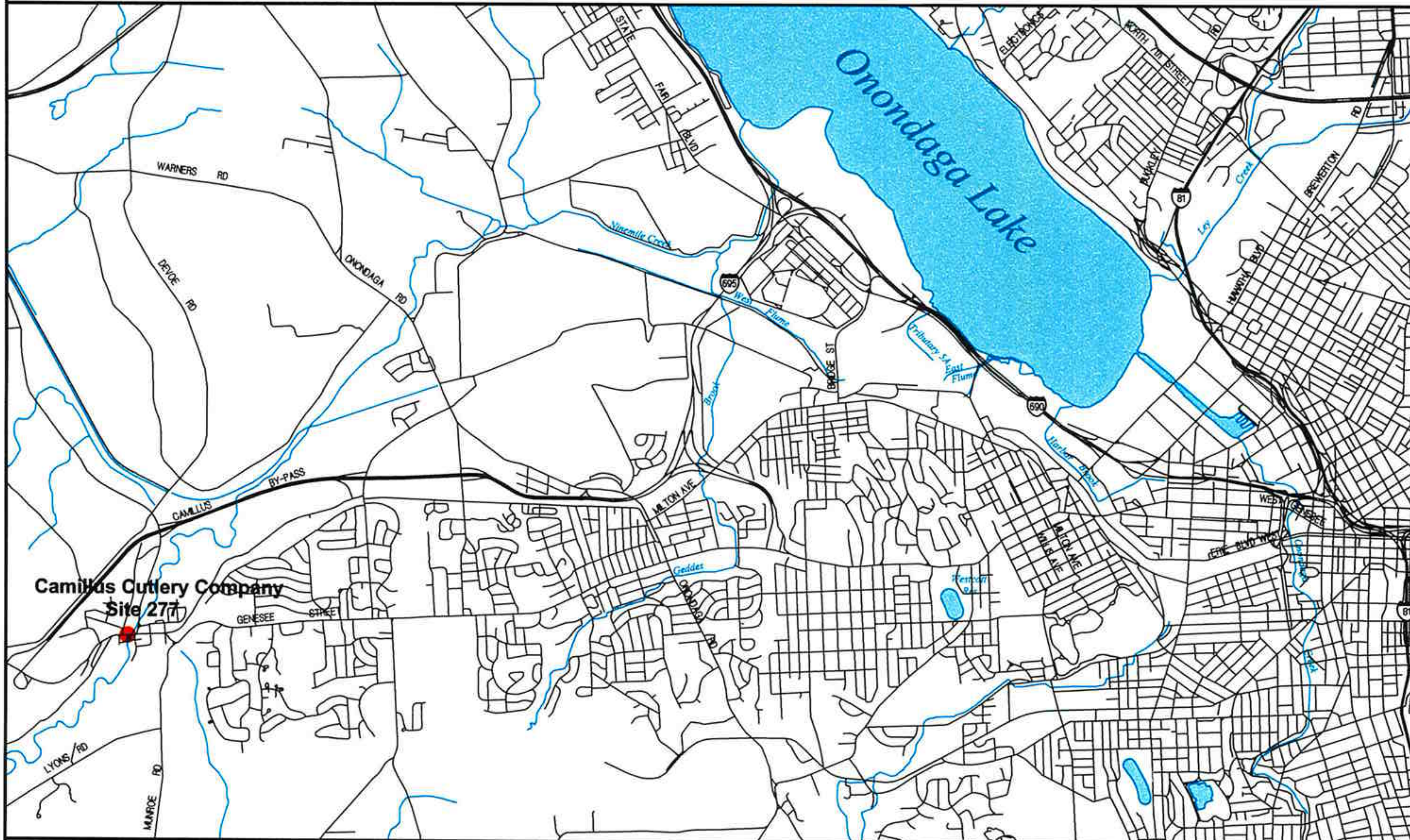
Site Location: Camillus Cutlery Company



Site Location

5000	0	5000

Scale in Feet

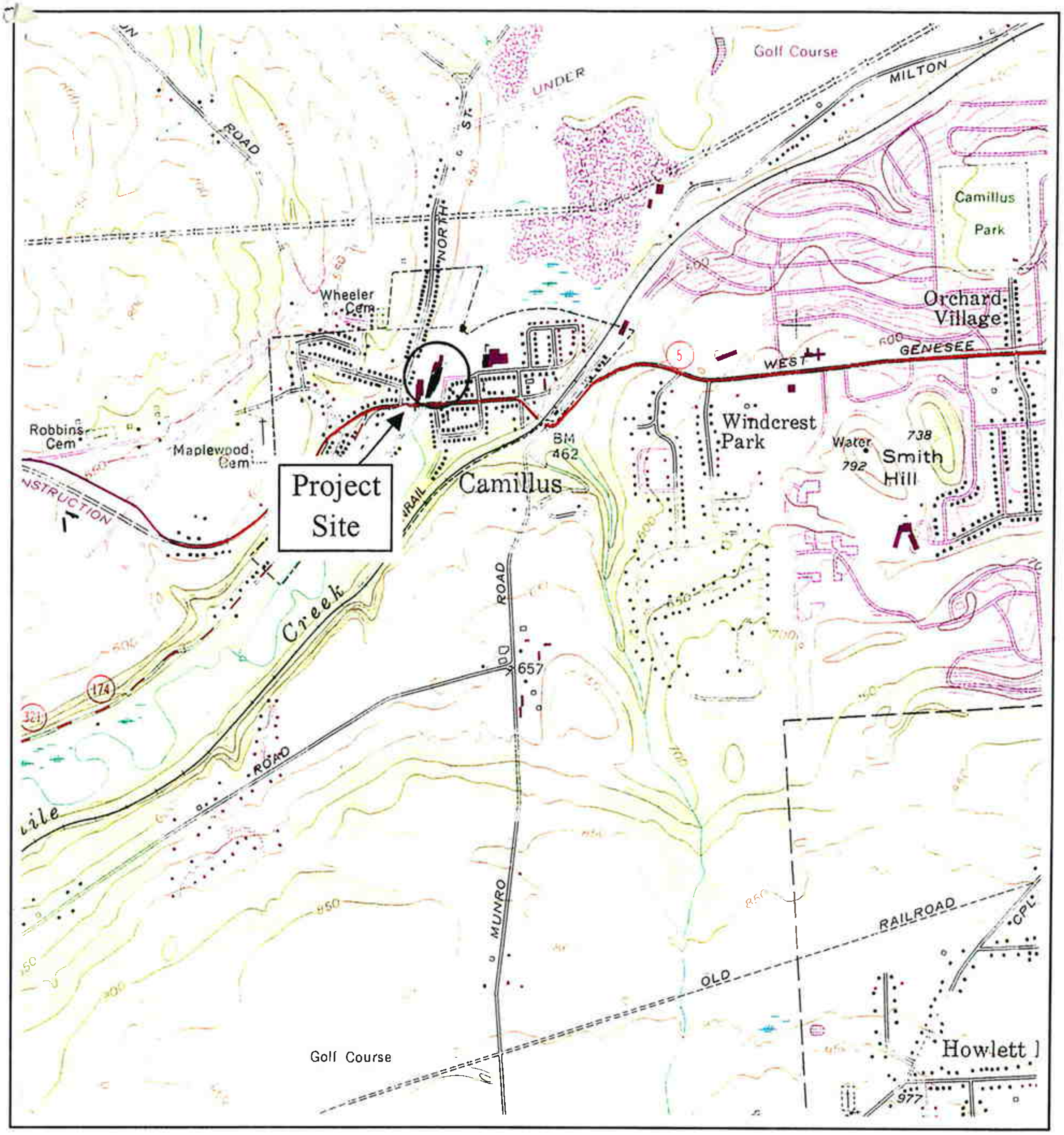
1500	0	1500

Scale in Meters

Figure 1

N

TAMS



SCALE 1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

NEW YORK
QUADRANGLE LOCATION

United States Geological Survey
Camillus Quadrangle
Camillus, New York

Figure 2